PORTABLE SYSTEM FOR CHOOSING PRE-OPERATIVE PATIENT TEST

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This invention relates to a medical test selecting device, and more particularly to a portable computerized device which administers a questionnaire to a patient, especially a surgical patient, even if the patient is bedridden, and is capable of printing out a full report including advice to a physician as to what pre-operative or other medical tests are indicated for that patient.

BACKGROUND OF THE INVENTION

It has been estimated that of the approximately $30 billion spent each year in the United States for medical tests, as much as 60% of that amount ($18 billion) is wasted on unnecessary tests; i.e., those which, for a given patient, would not be needed if the physician had the benefit of a reliable medical history. See, for example, *Are We Hooked on Tests,* U.S. News & World Report, Nov. 23, 1987, pp. 60–65, 68–70, 72.

This problem of unnecessary testing is particularly acute in cases where a patient is about to undergo surgery and, in order to determine the proper anesthesia, the patient's general medical history is taken.

This medical history strongly influences which diagnostic tests the medical staff chooses to perform before surgery. For example, if the patient discloses that he or she has any pain or discomfort upon urination, or has noticed any blood in the urine, then a urinalysis (a chemical analysis of the urine) ought to be performed. But if those symptoms are not present, it is considered medically unnecessary to administer a urinalysis, absent some other medical indication for the test.

Under current medical practice, it requires about seventy-five or more questions to determine which, if any, of the various available pre-operative tests (urinalysis, chest x-rays, EKG, etc.) might have to be performed before determining what anesthesia ought to be used during surgery. If the physician is not sure that all these questions were properly asked, or has doubts about the care with which the patient's answers have been recorded, he or she is likely to include in the battery of pre-operative tests many that could have been excluded based on an accurate patient history.

To save the time of physicians, questionnaires have been devised that can be administered by a nurse or other trained medical worker, or even directly filled in by the patient. But the time of a trained medical worker is also too valuable to spend on such tasks, since that makes the individual unavailable to perform other, more pressing, medical tasks which require such training.

If the patient completes the questionnaire alone, he or she may overlook or ignore some of the questions. Also, if the patient usually reads in a foreign language or has vision problems, he or she may have trouble completing the questionnaire alone.

Even if a questionnaire is fully and properly filled out, tallying of the patient's answers to determine which tests are needed is a time-consuming and tedious task, in the course of which medical workers sometimes inadvertently introduce errors.

Because of these problems, all too often a reliable medical history of this type is not taken prior to surgery, in which case the patient may have to undergo a comprehensive battery of pre-operative tests, many of them unneeded. These unnecessary tests are expensive for the patient and a burden on an already overworked medical system. In addition, the more tests are done the greater is the risk of false positives and iatrogenic harm from pursuit of false positives. Therefore, there is a great need to "automate" the reliable taking and tabulating of pre-operative test questionnaires.

THE PRIOR ART

The prior art has proposed the use of computers or computer terminals to automate the taking of general-purpose medical histories. For example, in U.S. Pat. No. 3,566,370 of Worthington et al. a computer terminal which is connected by telephone lines to a mainframe computer displays questions on a CRT screen which are to be answered by the patient sitting at a full alphanumeric keyboard. After the patient answers the questions, the computer stores, formats and prints out the patient's medical history. The Worthington patent also suggests that the questions presented to the patient for the purpose of taking his medical history can be in foreign languages when necessary. U.S. Pat. No. 4,130,881 of Haessler et al. is similar to Worthington in many respects.

Published Japanese Patent Application No. 59-231676 is similar to the above-mentioned U.S. patents in its use of a computer console and full alphanumeric keyboard, except that in addition the computer there is programmed to develop recommendations. The recommendations are intended for the guidance of Japanese pharmacists, not medically trained physicians, in prescribing oral medications according to Chinese traditional folk medicine criteria. To date no computerized system has been developed which is specifically programmed to administer the particular sequence of questions which is considered appropriate for pre-operative test selection according to accepted western scientific medical criteria.

General-purpose computing machines of the type employed in the above prior art patents are much too expensive, bulky, and complicated for the task of automating the pre-operative test selection process. Moreover, the great majority of patients are not "computer literate" and find such equipment difficult to use even when they are feeling well. A patient who is about to go into surgery in the very near future is particularly likely to find a large-scale general-purpose computer system confusing and threatening. The problem is exacerbated by the fact that these computers require the patient to compose an answer on a keyboard containing the full range of alphanumeric characters and other keys.

The prior art has recognized the need in certain contexts for a simplified special-purpose data-processing device which offers the non-computer-literate person a simple choice between "yes" and "no" answers, as in published French Patent Application No. 77 17048. But the computer in that application is programmed to recommend a skin cosmetic regime rather than a medical treatment procedure.